

provide a more precise prognostication of survival for patients with OCSCC compared to TNM staging. Further investigation of these prognostic roles is merited to allow individual patient risk-stratification and may help in treatment decision and trial design.

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IS A SHIFT IN THE STANDARD OF CARE CHEMOTHERAPY FOR PATIENTS WITH ESOPHAGEAL CANCER PRE-MATURE?

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Purpose: To compare outcomes among patients with localized esophageal and gastro-esophageal junction (GEJ) cancer who received concomitant chemo-radiation (CRT) using either cisplatin/5-FU or carboplatin/paclitaxel. CROSS trial demonstrated efficacy of carboplatin/paclitaxel in tri-modality setting. However this regimen has also been adopted as an alternate for patients receiving CRT as definitive treatment due to better tolerance.

Methods and Materials: Medical records of all patients diagnosed with localized carcinoma of esophagus and GEJ who underwent definitive CRT using cisplatin/5-FU, carboplatin/5-FU, or carboplatin/paclitaxel between January 2008 and March 2015 at our academic centre were reviewed.

Results: Seventy-five patients (79% male) were identified with a median age of 74 years (range 45-86). Most (66%) had an adenocarcinoma and 37% squamous cell carcinoma. Sixty-three percent had distal 1/3rd and/or GEJ tumour. 48% received cisplatin/5-FU, 35% carboplatin/paclitaxel and 17% carboplatin/5-FU. Most patients (99%) received 50Gy in 25 fractions. The median overall survival (OS) for cisplatin/5-FU group was 27 months (m) (95%CI 17-39) with three-year OS of 42%, in contrast to 14 m (95%CI 11-17) and 13% among patients received carboplatin/paclitaxel (log-rank $p = 0.006$). The median OS for carboplatin/5-FU group was 17 m (95%CI 11-81) with three-year OS of 38%. Cisplatin/ 5-FU group had a significantly better distant metastasis free survival (median 20 versus 11 m, $p = 0.04$) when compared to carboplatin/paclitaxel group. On multivariate analysis, cisplatin/5-FU (hazard ratio(HR) 0.45, $p = 0.023$) and carboplatin/5-FU group (HR 0.46, $p = 0.093$) were found to be associated with OS adjusted for other patient, disease and treatment related characteristics.

Conclusions: We report that patients receiving cisplatin/5-FU had a significant survival benefit compared to patients who received carboplatin/paclitaxel as a definitive treatment for esophageal and GEJ cancer. Carboplatin/ 5FU might be a reasonable alternate for highly select patients. Clinical trials regarding optimal chemotherapy regimen are warranted for patients who are not surgical candidates.

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PLANNED VERSUS 'DELIVERED' BLADDER DOSE RECONSTRUCTED USING SOLID AND HOLLOW ORGAN MODELS DURING PROSTATE CANCER IMRT

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Purpose: All studies to date have evaluated the dosimetric effect of bladder deformation using an organ model that includes the dose to the urine. This research reconstructed bladder dose using both hollow and solid organ models, to determine if dose/volume differences exist.

Methods and Materials: Thirty-five prostate IMRT patients were selected, who had received 78 Gy in 39 fractions and full bladder instructions. Biomechanical modeling and finite element analysis was used to reconstruct bladder dose (solid and hollow organ model) using every third CBCT throughout the treatment course.

Results: Reconstructed bladder dose was 11.3 Gy greater than the planned dose with a hollow model ($p < 0.001$) and 12.3Gy

greater with a solid model ($p < 0.0001$). Median reconstructed volumes within the 30 Gy, 65 Gy and 78 Gy isodoses were 3-4 times larger with the solid bladder model ($p < 0.0001$). Using a solid bladder model resulted in a difference between planned and reconstructed dose that was 10% larger than when using a hollow model. The difference between planning bladder volume and median treatment volume was associated with the difference between the planned and reconstructed dose below 78 Gy ($R^2 > 0.61$).

Conclusions: Substantial differences exist between planned and reconstructed bladder dose, associated with the differences in bladder filling between planning and treatment. Dose reconstructed using a solid bladder model over-reports the volume of bladder within key isodose levels and overestimates the differences between planned and reconstructed dose. Dose reconstruction with a hollow organ model is recommended if the goal is to associate that dose with toxicity.

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LATE TOXICITY AFTER TBI IN AHCT FOR RELAPSED FOLLICULAR LYMPHOMA

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Purpose: Follicular lymphoma (FL) is a progressive relapsing hematologic malignancy. At The Ottawa Hospital (TOH), autologous hematopoietic cell transplantation (AHCT) utilizing total body irradiation (TBI) has been used to treat relapsed FL patients for over 20 years. We reviewed our large single institution experience and assessed outcomes and late toxicity.

Methods and Materials: We retrospectively reviewed consecutive patients undergoing AHCT for relapsed FL from July 1991 to February 2013. The pre-AHCT conditioning regimen was commonly Etoposide/Melphalan/TBI. Patients received TBI on a linear accelerator using a translating-bed technique. The total dose was 5 Gy/1fr for 92% of patients, the remainder received 12Gy/6fr. Lung attenuators were used to maintain dose homogeneity. Patient information was stored on our bone marrow transplant (BMT) database. Descriptive statistics were calculated for all relevant demographic variables. Overall survival was estimated from the BMT date using the Kaplan-Meier method. Second malignancies were reported. Late toxicity was assessed in patients with at least one year of follow up (FU). Lung, kidney and thyroid toxicity was evaluated through extensive chart reviews. Clinical toxicity, creatinine, PFTs, chest imaging, thyroid function tests were assessed pre-AHCT and post-AHCT.

Results: We evaluated 174 patients with a median age of 50 years at transplant. There were 106 men and 68 women. Median follow up was 6.0 years. Median follow up among survivors was 8.3 years. Overall survival at one, five, 10 and 15 years was 93%, 73%, 57% and 47% respectively. Eighteen patients (10.3 %) developed a second malignancy; 11 (6.3%) had solid tumours, two (1.1%) had AML and five (2.9%) developed myelodysplastic syndrome. Median time to second malignancy was 7.2 years, with cumulative incidences of developing second cancer at 5% and 8% at five and 10 years. We evaluated 149 patients with at least one year of follow up. Of 80 assessable patients, 23% developed hypothyroidism; 3% were hypothyroid beforehand. Pre-AHCT, creatinine ranged from 41 to 139 $\mu\text{mol/L}$. Post AHCT, at last FU, of 116 patients, creatinine ($\mu\text{mol/L}$) was < 100 in 63%, 100-150 in 20%, 151-200 in 6% and > 200 in 9%. Hemodialysis was required for two patients. Clinical lung toxicity was noted in 6% of 95 patients. PFTs were recorded in 26 patients pre-AHCT and 46 patients post-AHCT. Abnormalities in DLCO were noted in 17% pre-AHCT and 26% of post-AHCT. Abnormalities in FEV1 were noted in 11% pre-AHCT and 25% of post-AHCT. Radiologic abnormalities were noted in 39%, with 23% being fibrotic changes, possibly radiation-induced, and 17% likely unrelated.

Conclusions: Our results with TBI-based AHCT for relapsed FL are very good, with most patients surviving 10 years post-AHCT.